amateur radio

Vol. 36, No. 8
AUGUST
1968

30c

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POWER TRANSFORMERS

Type No. PF	H.T. Sec. Volts	Max. D.C. mA.	Rectifier Heater V.	A.	Other Heaters V.	A.	Price
2071	250-0-250	60	6.3	1	6.3CT	2	$6.30
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1882	325-0-325	60	6.3	1	6.3	2	$7.20
			tap 5	2			
1884	250-0-250	80	6.3	1	6.3	2	$7.20
			tap 5	2	6.3CT	2	
1885	285-0-285	80	6.3	1	6.3	2	$7.50
			tap 5	2	6.3CT	2	
1886	300-0-300	80	6.3	1	6.3CT	2	$8.50
			tap 5	2	6.3CT	2	
1889	285-0-285	100	6.3	1	6.3	2	$8.40
			tap 5	2	6.3CT	2	
1890	300-0-300	100	6.3	1	6.3CT	2	$8.80
			tap 5	2	6.3CT	2	
1892	385-0-385	100	5	2	6.3	2	$11.30
					6.3CT	2	
1894	300-0-300	125	6.3	1	6.3CT	2	$9.00
			tap 5	2	6.3CT	2	
1896	250-0-250	150	6.3	1	6.3CT	2	$10.00
			tap 5	2	6.3CT	2	
1928	285-0-285	150	6.3	1	6.3	2	$12.00
			tap 5	2	6.3CT	2	
1929	325-0-325	150	6.3	1	6.3	2	$15.00
			tap 5	2	6.3CT	2	
1932	285-0-285	175	5	3	6.3	3	$13.50
					6.3CT	3	
1783	410-0-410	180	5	3	6.3CT	2.5	$15.50
					6.3CT	4	
1937	300-0-300	200	5	3	6.3CT	3	$14.00
					6.3CT	3.5	
1938	350-0-350	200	5	3	6.3	3	$14.70
					6.3CT	3	
1939	450-0-450	200	5	3	6.3	3	$20.00
					6.3CT	3	

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"AMATEUR RADIO"

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AUGUST 1968
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★

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CONTENTS

Page

Technical Articles:—

A Field Effect Transistor Voltmeter 11
A Small 150W. AM-CW Transmitter using a 6DQ5 Final 6
Sidac—A Poor Man's Variac 9
Sidebanding—by a Greybeard for Greybeards 8

W.I.A. Federal Executive:—

Federal Comment: The Remembrance Day Contest 5
The Remembrance Day Formula 15

General:—

Correspondence 14
DX Notes 12
Federal QSL Bureau 16
New Call Signs 14
N.S.W. Intruder Watch Co-ordinator 16
Prediction Charts for August 1968 10
Publications Committee Reports 12
VHF Notes 14
W.I.A. D.X.C.C. (S.W.L.) 12

Contests:—

Oceania Winners of 8th All Asian DX Contest, 1967 13
VK-ZL-Oceania DX Contest, 1968 13
9th All Asian DX Contest, 1968, Precis of Rules 13

W.I.A. OFFICIAL BROADCASTS

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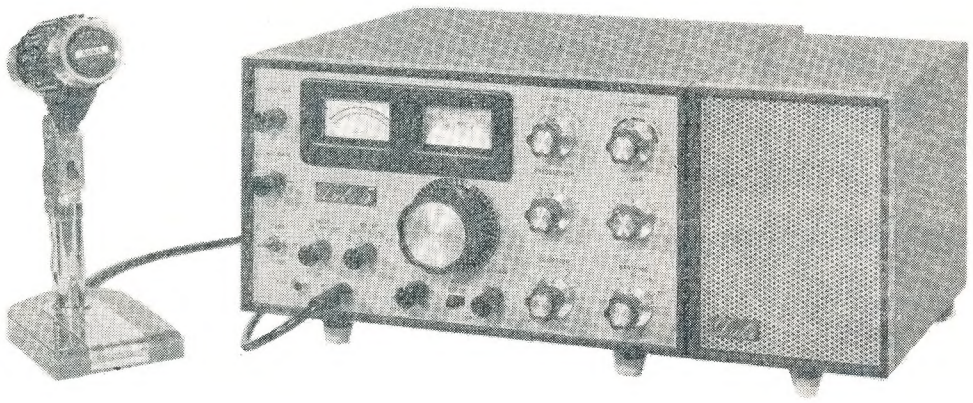

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The Remembrance Day Contest

The month of August has come around once again and with it comes the W.I.A. Remembrance Day Contest. Every Australian Radio Amateur should know that the reason for this contest is to perpetuate the memory of those Amateurs who lost their lives in World War II. To this end the contest date is taken as that week-end nearest the fifteenth of August—the day in 1945 that hostilities ceased in the Pacific.

The first R.D. Contest, or simply R.D. as it has become known, was held in 1948 and consequently it is the twentieth event being held this month. Over that twenty years the contest has proved most popular and perhaps not unexpectedly, has attracted a greater number of VK contestants than any other contest.

However, it has not been smooth going over the years and many hours have been spent by Federal Council in discussing the detailed rules of the contest. It costs the Institute a great deal of money to convene a Federal Convention and almost every year Council must spend a disproportionate amount of time discussing this detail which could and should be handled by the group co-opted for the purpose—the Federal Contest Committee. No doubt Council must lay down general policy and guide lines for the committee, but reference to minutes of recent Federal Conventions will show that this is not so.

The basic problem is that the rules as they have existed over the years with two exceptions have most definitely favoured the numerically smaller Divisions. No amount of protest from these Divisions can alter the facts as shown in the accompanying table. Cries of "if the larger Divisions organise themselves and their operators they can win" are not acceptable as the larger Divisions have shown themselves, for a number of reasons, unable to do this. New South Wales won in 1948 and Victoria won in 1967, but the rules were significantly different in those two years from the other eighteen.

Professional people, well qualified in the mathematical side of statistics, have been asked by Federal Executive and Federal Council to examine the situation and devise a mathematically unbiased set of rules—rules that would allow any Division to win on its merits. The latest report arising from motions at the 1968 Convention appears elsewhere in this issue, but the result remains unchanged. **It is impossible under the present terms of reference to produce a set of R.D. Contest rules that are unbiased.**

Federal Council has recognised this situation and unanimously carried agenda item 6.1.1 as stated in Dr. Blackman's article. Despite the fact that earlier reports made this quite clear, Divisions have persisted in bringing up the agenda items that waste the time of Federal Council in trying to discover non-existent solutions.

FEDERAL COMMENT

If the situation as it exists is accepted then there are two alternatives:

(1) Accept the fact that the rules will always have a bias and alter the bias periodically so that all Divisions will have a chance to hold the trophy. This approach is fraught with some difficulty as obviously the degree of bias could not be such as to allow only one Division to win. A consideration of past winners would allow the Contest Committee to determine in which direction the bias should be.

(2) Alter the concept of the Contest as it now exists.

Dr. Blackman discusses the second alternative in some detail and his article is commended to all interested Amateurs. The first alternative is virtually the situation that now exists, but when the attempt to change the bias came in 1967 the smaller Divisions reacted to a larger Division winning (its first win ever) by immediately demanding a return to the old rules despite an agreement in 1967 that the new rules be given a three years' trial.

It would be of some interest to observe the reactions of the smaller Divisions if, say, the A.C.T. or the Northern Territory were to become a seventh Division. This new Division would certainly then become the smallest and would have little difficulty in winning every contest under the present rules. No doubt some permanent changes would be introduced then and quickly too.

It is unfortunate that such short sighted views should have carried weight for so long. It is anticipated that members of the larger Divisions, seeing no chance of their side winning, will begin to loose interest and not bother to take part. As the numbers of contestants in the larger Divisions drop off, the others will find they have no one to work.

Let us remember, whilst considering the fate of this fine contest, the reason for its being and then let us ask if it were to be so bad that by suitable biasing, every Division would have a practical chance of holding the Remembrance Day Contest Trophy?

—D. H. RANKIN, VKQV,
Federal Activities Officer.

— . . . —

PAST R.D. CONTESTS

The first Remembrance Day Contest, or "R.D." as it is now familiarly called, was held in August 1948. Since then, the winning Division has been recorded on shields mounted on the base of the trophy. These shields give the following information:—

1948	New South Wales
1949	Tasmania
1950	Tasmania
1951	Tasmania
1952	Western Australia
1953	Western Australia
1954	South Australia
1955	South Australia
1956	Western Australia
1957	Western Australia
1958	Western Australia
1959	Tasmania
1960	Tasmania
1961	Western Australia
1962	Western Australia
1963	Queensland
1964	South Australia
1965	South Australia
1966	Western Australia
1967	Victoria
1968	????

SMALL 150W. AM-CW TRANSMITTER USING A 6DQ5 FINAL

RODNEY CHAMPNESS, VK0CR/VK3UG*

IN these days of s.s.b. and so forth an a.m./c.w. transmitter may seem a rather out of date sort of piece of equipment to describe. Personally, I feel there is a place for both modes of communications as each has its own strong points and weaknesses, so no more need be said in this vein. This particular transmitter was built on Macquarie Island for communications around Macquarie on voice and to New Zealand on c.w. on a frequency of approximately 2.7 Mc. In this regard, it has proved highly successful, having been heard in Australia quite well on both voice and c.w.

The transmitter in this article is not intended to be copied unless you are working crystal control on 160 metres say, as it was designed for a particular job on Macquarie. Many of the ideas used in this transmitter may be applicable to some pet project. The main part of the article is to give the operating conditions of the 6DQ5 p.a. stage. An article was presented in "Amateur Radio" for June '65 by VK3AFQ using an 807 in the same role that I have the 6DQ5 working.

This is an "efficiency" modulated transmitter in the a.m. mode and its peak input is approximately 150 watts, which means that it is approximately equivalent to a 40 watt plate and screen modulated transmitter. In the c.w. mode it runs a full 150 watts and puts out about 110 watts. Before I launch into a description of this transmitter, I would recommend that you read VK3AFQ's article and also read in the R.S.G.B. Handbook, page 261, "Series Gate Modulation". Both of these articles will put you fully into the picture on the way this modulation and c.w. keying system works.

* 24 O'Dowds Road, Warragul, Vic., 3820.

The oscillator and driver are quite conventional and require no comment other than that the driver is keyed and not the final. The microphone preamplifier circuit is also quite conventional and once again no comment is necessary.

The 6DQ5 requires little comment with the exception of the by-passing and the screen circuits. Pins 4 and 8 of the 6DQ5 should each have a separate by-pass of about 100 pF. if the transmitter is to be used at high frequencies. Pins 3 and 6 should be treated in like manner.

"GATED SCREEN" MODULATION

At this point I will give a brief rundown on the operation of this "gated screen" modulation system. We will consider the c.w. situation first as it will help to make clear the operation of the a.m. modulation system. With key up, there is no negative voltage developed at the grid of the 6DQ5 and therefore the grid pin 7 of the 12AU7 modulator is at earth potential or a few volts negative due to the grid being positive in respect to the cathode pin 8, which is set a few volts negative by the slider on VR3. The actual voltage present on the grid and cathode is controlled by VR3, the "c.w. cut off" bias potentiometer. Pin 7 isn't quite as negative as pin 8. This triode pins 6-7-8 is conducting heavily and the voltage on pin 6 is also negative with respect to earth by a few volts. Pin 2 is also negative by the same amount, being directly connected to pin 6. Pin 2 is slightly more negative than pin 3. Triode 1-2-3 is virtually at cut-off. Triode 1-2-3 and its series cathode resistor act as a potential divider, the triode acting as a variable resistance, and depending on its state of conduction will depend the voltage applied to the screen of the 6DQ5.

As the 1-2-3 triode is not conducting, or virtually so, the negative 105 volts will be applied through the 0.22 meg. resistor to the screen of the 6DQ5. With a negative voltage on the screen, no current will be drawn by it, and with this valve all plate current ceases when the screen is negative by about 10 volts. In the case where an 807 is used, which has a much different screen characteristic, this voltage may be a few volts positive. This is the condition with key up.

With key down and drive to the final, a high negative bias is applied to pin 7 so cutting this triode off. With this triode cut off, pins 6 and 2 tend to rise to full high tension, causing triode 1-2-3 to conduct heavily, the cathode becomes positive and current flows through the

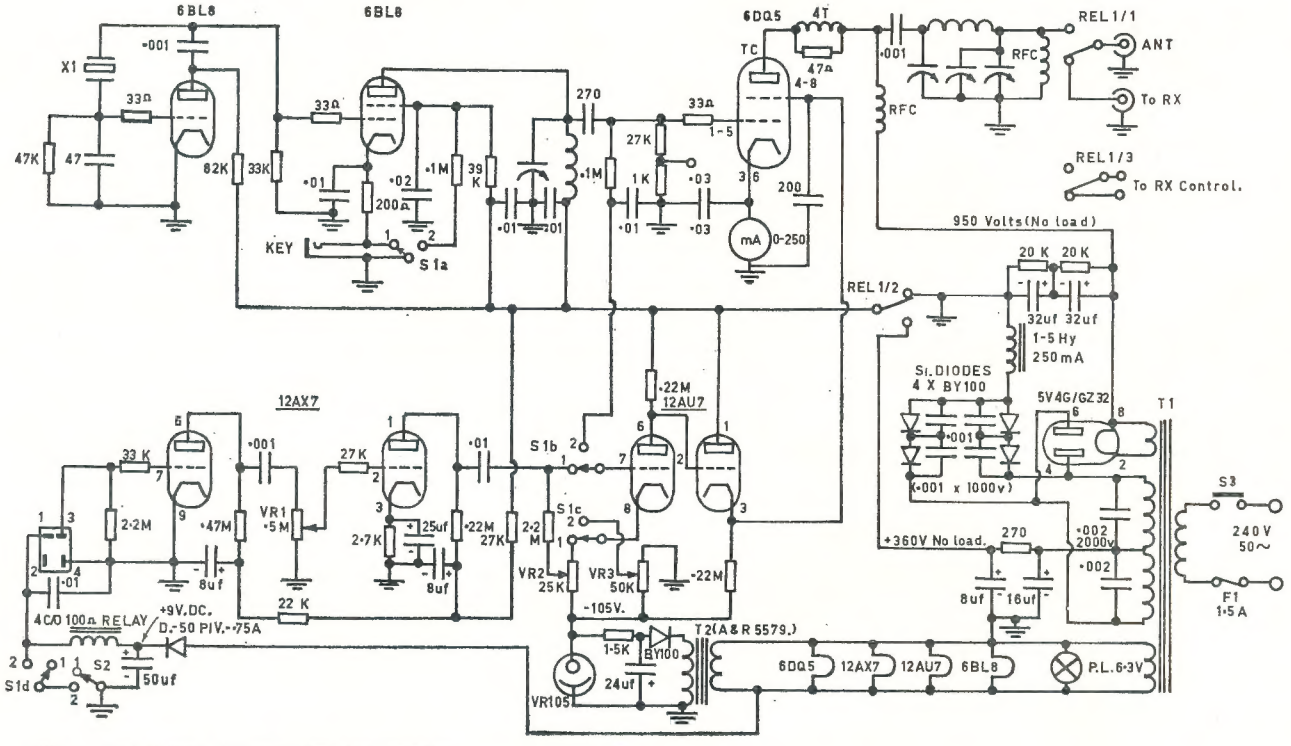

FIG.1. 150 WATT AM/CW TRANSMITTER.

S1—Pos. 1: a.m. Pos. 2: c.w.
S2—Pos. 1: receive. Pos. 2: transmit c.w.
S3—Mains on/off switch.
VR1—Modulator gain.
VR2—a.m. carrier set.
VR3—c.w. cut off.

6DQ5 screen to earth. The negative 105 volts has no effect as it is only applied through a very high value resistor. Under key down conditions, the screen voltage rises to about 125 volts. When on receive, a high negative bias is placed on the screen as there is no high tension supply to the modulator (c.w. clamp tube).

On a.m., conditions are something similar. In this case the grid pin 7 is connected via a high value resistor to the slide of a potentiometer going to 105 volts negative. The slide is adjusted so that the resting carrier is one-fifth to one-eighth of the c.w. value, which means that triode 6-7-8 is conducting a fair amount and the plate pin 6 and grid pin 2 are a few volts positive, about 5 volts, to give a resting carrier of one-fifth the c.w. carrier level.

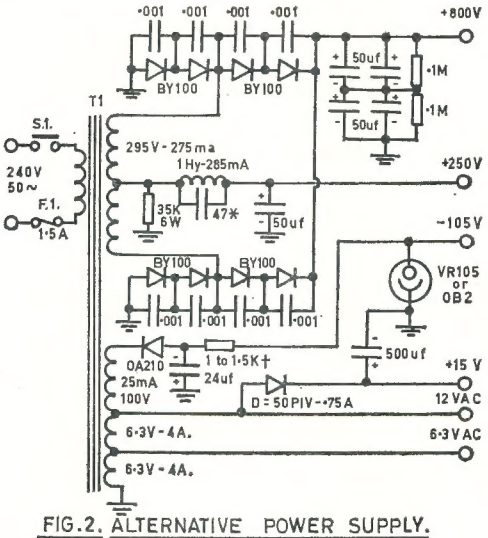

FIG. 2. ALTERNATIVE POWER SUPPLY.

T1—Ferguson PF2211 transformer. 295 volts per side at 275 mA., 100 volts at 25 mA., and two 6.3v. at 4 a.

* This value approximate; experiment to get least ripple output.

† Adjust the value of the resistor to give about 20 mA. through current. Wattage rating is 1 watt.

Now when voice is applied to pin 7 we tend to get a leaky grid effect and a negative bias is developed, causing the valve to alter its operating point towards cut off. With this alteration in the operating point the screen of the 6DQ5 will receive a more positive voltage, depending on how much speech level is used at the grid of triode 6-7-8. On this increased d.c. voltage is also impressed the audio modulating voltage. So when you're not speaking p.a. current is low, so keeping the p.a. valve and the power supply cool, and when you speak the screen voltage is increased, the carrier increases, and your modulation is impressed on the carrier to a level of approximately 90% all the time. Audio quality isn't hi-fi but is quite good communications quality. The plate current meter should go to about two-thirds of the c.w. value on speech.

POWER SUPPLY

The power supply is quite standard, perhaps one of the special transformers being produced for s.s.b. transceivers, such as the Ferguson PF2211, would be very satisfactory for this supply in lieu of the two transformers I had to use in this supply. This of course is up to you. Fig. 2 shows a supply using this transformer, the exact voltages I can't give as I haven't built it, but the ones shown should be fairly close. On Macquarie you use what you have on hand as there are no shops to buy anything down there.

To adapt this design for Amateur band use, probably a Geloso v.f.o. and a switched pi output tank would do the job of converting this design to an all-band Amateur transmitter.

MODIFICATION TO GELOSO VFO

Geloso v.f.o's are prone to drift a bit at the beginning of each over. Here is a modification which will help you to stay near zero beat right throughout a QSO. Someone told me of this one, but I can't remember who.

The v.f.o. is modified so that the oscillator is left running all the time and to prevent the v.f.o. from interfering with the incoming signal, a relay in close proximity to the oscillator switches in and out a small value capacitor which shifts the oscillator frequency outside the band during receive.

Another way of doing this is to use a baised diode in series with this self same detuning capacitor and by either making the diode conduct or cut off, the capacity will be switched in or out of circuit.

These modifications are shown in Figs. 3 and 4. The exact values of components would be subject to experimentation. The v.f.o. will probably have to be re-aligned after this modification. With this modification you will probably find that you will be able to take your place in a sideband net without anyone really being the wiser.

A.M. AND C.W. SIGNAL

This transmitter, I feel, is an ideal way of getting on the bands with an a.m. and c.w. signal as it would not be unduly expensive, should be fairly stable in frequency, and is a high power c.w. transmitter with a moderate power a.m. capability. This would make an ideal stand-by rig for the ardent s.s.b. man (although I'm sure they wouldn't agree) for when the s.s.b. rig is down for maintenance or mods., etc.

I intend building this type of modulator into a future s.s.b. transmitter that I have on the drawing board at the moment. A few eyebrows lifted, I imagine, but I must admit I do prefer a.m. with both sidebands, not the carrier and one sideband that most s.s.b. transceivers and transmitters emit. This particular method of a.m. production, if applied to an s.s.b. transmitter would give approximately twice the peak output obtainable with the carrier and one sideband system used in most equipment. Incidentally, the Drake TR4 uses a similar system to this on a.m.

Why incorporate a.m. in an s.s.b. transmitter? I look at it this way, that not all Amateurs have the time, facilities or money to have really first class equipment. This is no reflection on them as this is a hobby and as long as the equipment used is within the standards set down by the P.M.G., there should be no real grouches.

MISCELLANEOUS POINTS

Instead of the cathode of the driver being keyed, the 105 volt negative voltage could be used to grid block the driver stage, as shown in Fig. 5. It will be noted that I haven't used any keying envelope circuits in the keyed circuit either in this suggested modified keying circuit or the original. If the time constant of the 100K ohm resistor and 0.01 uF. capacitor from the grid of the p.a. to the grid of the 12AU7 pin 7 is calculated, it will be found that using formula $T = 5CR$, where T is in seconds, C is in farads, and R is in ohms, it works out to 5 milliseconds which is a reasonable time for the transmitter to reach full transmission from time of key down. This will give a c.w. signal which is free of clicks.

Unfortunately, this time of 5 milliseconds is the time taken for the capacitor to charge or discharge from about

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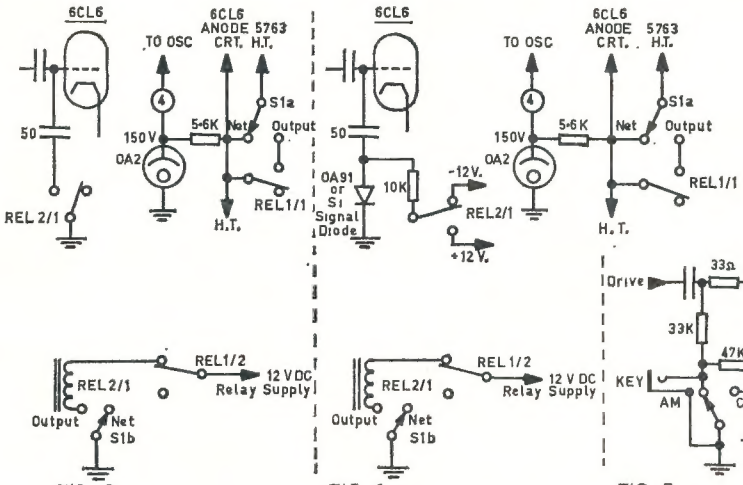

FIG. 3. FIG. 4. FIG. 5.

MODIFICATIONS TO GELOSO V.F.O. TYPE N4/104. CONTINUOUS OSCILLATOR OPERATION.

GRID BLOCK KEYING CIRCUIT.

Fig. 3 Memo.—Relay 1/2, 1/1 is the normal change-over relay. Relay 2/1 is the oscillator detuning relay. Circuit shown in netting condition.

Fig. 4 Memo.—Relay 1/2, 1/1 is the normal change-over relay. Relay 2/1 switches voltage so that OA91 is conducting with the 50 pF. in circuit or non-conducting with 50 pF. out of circuit.

Sidebanding—by a Greybeard, for Greybeards

W. J. MEAD,* VK4BM (Ex VK5JM)

THIS is **not** a technical article, but a description of my own attempts at s.s.b., hoping it may be of some assistance to others to get with "IT" (The Thing).

Last year, on a visit to some of my Amateur mates in Adelaide, I had the pleasure of seeing two home-brew copies of a Swan Tribander Transceiver (Jack VK5LN and Lee VK5BH), and another in the course of construction (Athol VK5LQ). A copy of the circuit was provided by Athol (plus advice, "Don't touch it, mate. It will drive you crackers"), a set of crystals and odds and ends promised by Jack.

A fortnight after my return to the land of Bent Bananas, a box arrived containing a set of crystals and band-change switch. And so, as soon as I finished my weekly VK5 sked, I started on The Thing.

The only test equipment used was a multimeter and a receiver for monitoring the filter frequency and setting the v.f.o. on frequency.

After a lot of trial and error (and stupidity), I finished up with the circuit in Fig. 1 (carrier osc., mic. amp. and balanced modulator).

The i.f. and other circuits are straight forward and can be found in any modern handbook. I use single conversion, with a Colpitts v.f.o., 6BA7 mixer, 12BY7 driver, and 6DQ5 final. The final has 500v. on the plate, 150v. on the screen, and I load it to 150 mA. when tuning up. I do this by unbalancing the diode modulators but the easy way would be to provide for carrier insertion.

Within three weeks of the start of the project I was with "IT".

I apply enough negative bias to the final to hold the plate current to 40 mA., and set the audio gain control so that the meter kicks to 120 mA. on occasional peaks.

"IT" has been used on 80 metres, mainly 40 metres, and for the latter part of '67 on 20 metres. I don't claim to have worked the world for, quite frankly, I get most enjoyment from trying out different ideas. But I think I have learned more of the art by building than I ever did by just reading.

SOME HINTS

A few of the things I learned the hard way are:—

(1) Complete shielding of the three last stages of the transmitter is a must, otherwise r.f. feedback will drive you up the wall!

(2) The final and, if you are not careful, the driver must be neutralised. I find it easier to neutralise the final by inserting some carrier and adjusting neutralising condenser until maximum output into antenna coincides with minimum plate current.

(3) Don't try to feed too much s.s.b. from the i.f. stage into the mixer. I use capacity coupling and the most that need be used is 10-15 pF., no more, otherwise you are well on the road towards excessive mixing distortion.

(4) the v.f.o. **must** be supplied from a regulated source. I use 105v. and find it ample for my needs.

TRANSCEIVING

Having proved that a Greybeard could do what a s.w.l. could ("A.R." Jan. '67!), I relaxed and thought "IT" would keep me contented for quite a while. **But**, come Xmas Eve, of all times, it was on again! The project this time? Transceiving, no less!

Accordingly, Old Faithful rush box was stripped from mixer to product detector. Then 5 Mc. xtal filter and i.f. stage taken from transmitter chassis and built into receiver. A further i.f. stage was added and, after lining up on the filter frequency, the receiver performed as I have been led to believe it should! But I did find it necessary to change the a.v.c. over to audio derived before I was really happy with it on 20 metres.

Next the carrier osc., mic. amp., and balanced mod. was transferred to the receiver chassis and, after a few teething troubles, output was taken from the i.f. following the filter through a 10 pF. condenser, also from the v.f.o. through a 50 pF., and fed to the transmitter mixer. A relay was added to receiver chassis to break voltage to screens of receiver r.f., mixer and 2nd i.f., apply negative bias to a.v.c. line and voltage to mic. amp. in transmit position. A set of relay contacts was used to break the output from the bal. mods. to the filter on receive and another set to disable the S meter on transmit.

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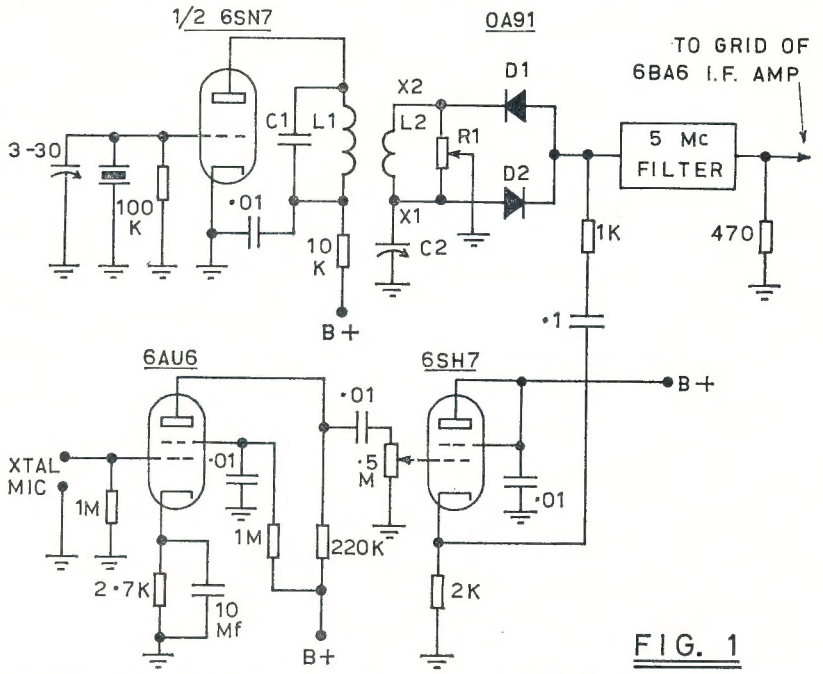

FIG. 1

L1-C1—Slug-tuned coil to suit the filter frequency.
L2—5 turns wound over the cold end of L1.
R1—Wire wound pot., 500-1,000 ohms.
C2—3-30 pF. Try it at either X1 or X2.

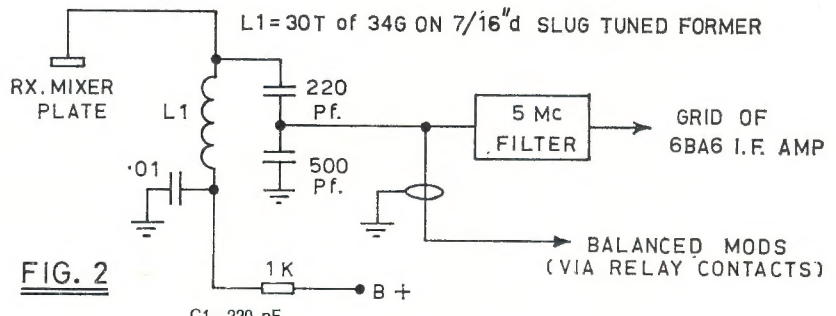

FIG. 2

C1—220 pF.
C2—500 pF.
L1—30 turns 34 g. on 7/16 inch slug-tuned former.

* 8 Cross Street, Mitchelton, Qld., 4053.

SIDAC—A POOR MAN'S VARIAC

COL HARVEY,* VK1AU

NORMAL Amateur practice is more towards methods of raising voltage, rather than reducing it. However, there are occasions on which a simple means of reducing mains voltage is required. In the past, this has been achieved by the use of a heavy, bulky and expensive variac. Now, a small pulse-activated diode can do the same job—and a kilowatt can be controlled by a 1 watt potentiometer!

The gadget to be described will handle up to 12 amps. sinewave and can swing the output from about 120 volts up to full mains voltage. It, therefore, can be used as an incandescent lamp "dimmer"; a speed controller for an electric drill; a "trimmer" for transformers supplying filament voltage; for smooth and continuous selection of desired h.t. or screen voltages for experiments; or for easy and safe transmitter final stage power adjustment.

Being bi-directional (full wave), one SIDAC[1] replaces two (half wave) silicon controller rectifiers. Also, SIDAC is inherently less susceptible to damage by voltage transients or current surges. Since SIDAC prices are substantially lower than SCRs of comparable ratings, the cost of replacement in the event of damage is relatively small.

The device is available in 1¼ amp., 2½ amp., 5 amp. and even 60 amp. r.m.s. ratings, and as it is non-polarised, it is used in series with the mains and the load. However, no significant current will flow until a trigger pulse is applied to the SIDAC, instructing it to "turn-on". (Fig. 1a) (Keep reading—it's not as difficult as it seems.)

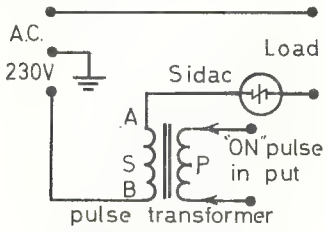

Fig.1a. Basic series trigger control circuit

The trigger pulse comes from a simple CR integrating network charged by the mains, and in which the capacitor is discharged through the primary of a transformer when it reaches the break-over voltage of another SIDAC. The transformer secondary is in series with the controlling SIDAC and the mains, thus superimposing the trigger pulse on the mains voltage and activating the SIDAC. See Fig. 1b.

K5B type SIDACs are rated to control 5 amps. r.m.s. at 10 cycles and to accept a 3,000 volt 20 usec. pulse without failure.[2] However, as an overseas report[3] suggests that in some circumstances some types of SIDAC may fail if the rate of change of voltage across the SIDAC exceeds 20 volts/usec., a simple RC suppressor is used across the control SIDAC to reduce this to a safe figure of about 2 volts/usec. (Fig. 2).

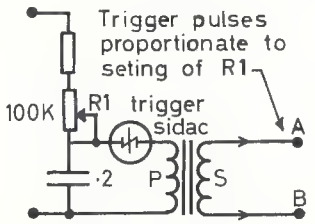

Fig 1b The Integrating, or voltage control circuit.

A possible problem in communication applications arises from the fact that the pulse used to turn-on the SIDAC will also appear on the line too and at the load unless simple precautions are taken, e.g. Fig. 3a. The value of C may need adjustment to ensure that the trigger pulse is not reduced so much that the SIDAC will not turn on. Note that the allowable value of C is affected slightly by the reactance of the mains. In my case, a value of 0.01 uF. is quite satisfactory for normal use with drills, transformers and incandescent lamps.

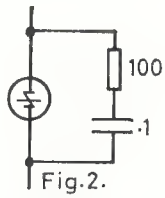

Fig. 2.—If SIDAC fails to turn-on with these values, increase the series resistance.

In more critical applications where, for example, it is desired to control items such as a t.v. receiver, a general coverage receiver, or perhaps a fluorescent lamp in the shack, radiated trigger pulse "noise" may be a problem. If so, it is necessary to use better r.f. filtering. (Fig. 3b) A suitable mains choke can be made with 5 amp. enamel wire on a nylon-insulated ferrite ring. Its inductance is not critical, but 70 uH. has been recommended.[3]

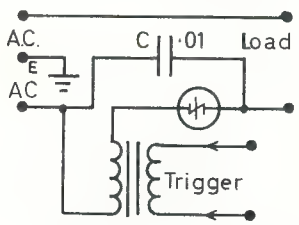

Fig.3a. Basic R.F. filter

An Eddystone diecast box makes an ideal chassis. When earthed to the third pin of the mains plug, it acts as an r.f. shield, but more important, provides adequate safety. For safety reasons, do not attempt to install the potentiometer remotely unless it and its shaft and grub screw are fully isolated from physical contact. This is important because the resistance element and slider can be full at mains potential, and unless the case and control shaft is reliably earthed or isolated, could, in the event of internal insulation failure, present a lethal situation to an unsuspecting "earthy" operator! Just in case the earth connection is open when an insulation breakdown occurs, I prefer to insulate the entire potentiometer from the diecast box.

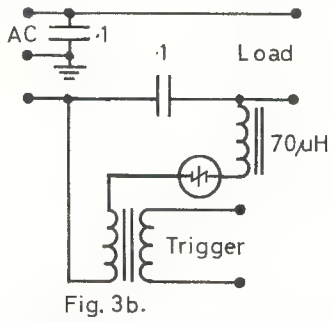

Fig. 3b.—Capacitor values may need adjustment to provide optimum r.f. filtering, without affecting trigger reliability.

Commercial components which are pre-requisites for voltage control by SIDAC are a pulse transformer (mine is 1" x 1" x ¾", price about $1.20); a trigger SIDAC type K2C, about 75c; and a 2½ or 5 amp. SIDAC type K4B20 or K5B20, price about $3.50. I used stock items from the Standard Telephones and Cables range, with immediate success.

If you want to roll your own pulse transformer, try a two-turn primary about 26 gauge, and a 20-turn secondary of about 20 gauge enamel (i.e., heavy

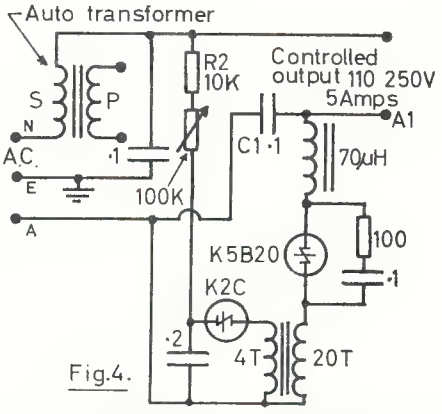

Fig. 4.—The auto transformer is not necessary if there is no requirement to compensate for low mains voltage. C1 may be more effective in some circumstances connected across the load.

* 16 Leane St., Hughes, A.C.T., 2605.

[1] Silicon Symetrical Diode Switch—a 5-layer device.

[2] S.T.C. Bulletin.

[3] I.E.E.E. Journal, August 1967.

enough to handle 5 amp.). A small iron core ¾" diam. by ¼" thick is used commercially, but providing it does not saturate badly under the firing pulse, a ferrite ring would probably do for non-critical applications. The full circuit is shown in Fig. 4.

If the firing pulse is non-oscillatory, it may be necessary to phase the pulse transformer connections so that the trigger pulse supplements rather than opposes the mains voltage.

In Fig. 4, R2 is selected to set the usable control range across the whole of the potentiometer scale, and to protect the potentiometer from damage. Without it, the control range is compressed into about half the potentiometer scale. Note also that the trigger transformer secondary and the r.f. filter choke carry the full load current, and are above earth. For applications where the few volts of IR insertion loss (1½ volts at 5 amps.) are critical, a switch can be installed to bridge mains terminal A to load terminal A1, thus allowing "full power" operation. Alternatively, and preferably, an auto-transformer arrangement can be used to increase the mains voltage and supply the controller with about 260 volts, thus giving true Variac capability.

I have not had the necessity to run the unit for long periods at maximum ratings. Under normal workshop conditions (such as drilling stainless steel) the SIDAC stays cold. However, a heat-sink which holds the temperature near 40°C. may be needed for more rigorous applications. If checking for temperature rise of the SIDAC, remember to disconnect the mains input before prodding the diode with a finger. The SIDAC case may be at full mains potential and therefore be hotter than you expect!

Contrary to some published information, this type of device does not hold drill-speed constant regardless of mechanical load. However, if the pressure on the drill is reasonably constant, a control setting can be chosen which will produce the desired steady slow working speed under load.

For Amateur purposes, there is probably no better or safer way of precisely controlling the output of a final stage high voltage power supply. So far as VK1AU is concerned, henceforth, switching of high voltage transformer secondary windings is for the birds.

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SIDEBANDING

(Continued from Page 8)

Fig. 2 shows how I fed receiver mixer and output from bal. mods. into the filter.

The v.f.o. used was the receiver h.f. osc. which had proved satisfactory on receive. It is a VK4BM modified Swan circuit! In other words, a Colpitts on 8 Mc. on 20 and 80; 12 Mc. for 40.

The valves used are a mixture of octal and miniature. A 6AC7 v.f.o., 6SN7 xtal osc., 6SN7 product detector, and 6SN7 mic. amp. and cathode coupled to bal. mods. do the job just as well as their modern versions.

In the transceiver I find I can do the same with 13 valves as I could with 11 valves in the receiver and 7 valves in the s.s.b. transmitter! With the added bonus of not having to net on to the other's frequency, because if the receiver is tuned properly that's just where the transmitter is!

That project took only a week! On New Year's Eve I was back on sked, much to the surprise of my VK5 mates!

Next project? V.f.o., probably transistorised, so that I can get on 10 and 15 metres as well. The present v.f.o. is quite good on 80, 40 and 20, but I doubt if I would be satisfied on the higher frequencies.

CONCLUSION

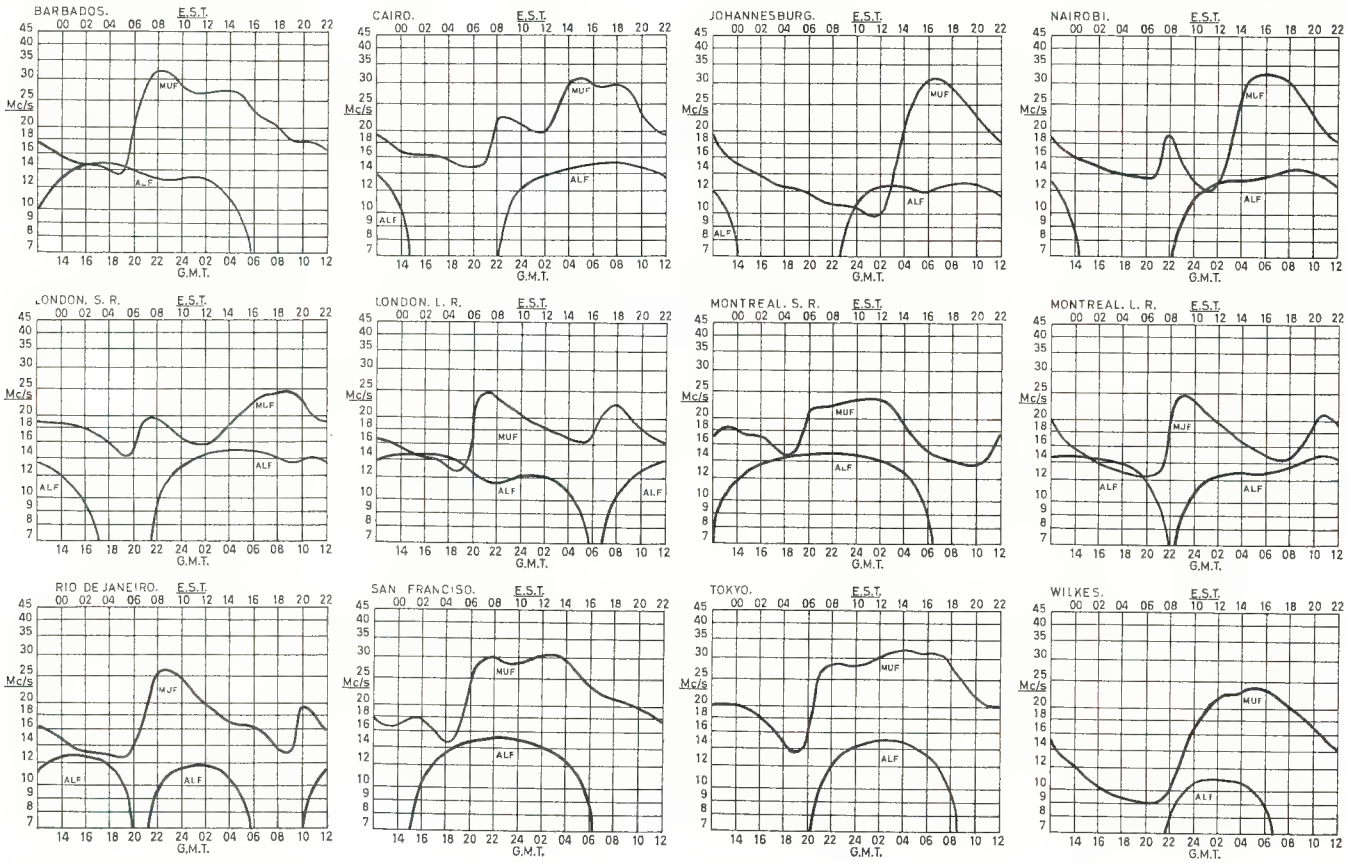
In conclusion, I am just a plain, ordinary Greybeard, 50 years plus a couple and certainly **not** the brainy type. If I can do "IT", surely anybody can!

Here's hoping to work you on s.s.b. in '68! For, if you don't get cracking now, who knows but that PanSy might beat you to "IT"!

AMATEUR FREQUENCIES:
USE THEM OR LOSE THEM!

PREDICTION CHARTS FOR AUGUST 1968

(Prediction Charts by courtesy of Ionospheric Prediction Service)



A FIELD EFFECT TRANSISTOR VOLTMETER*

M. ALLENDEN, G3LTZ

YOU can equate this meter to the old familiar valve voltmeter; it's got all the advantages that an 11 megohm input impedance can give, without the disadvantage of mains power supplies and consequent lack of mobility.

CIRCUIT DIAGRAM

A glance at Fig. 1 shows that the FETs have merely replaced the valves in a conventional circuit. Operation is on the basis of a balanced pair of amplifiers, the gates of which are biased by tapping the power supply to earth (chassis) and connecting TR2 gate to chassis. TR1 gate is similarly (d.c.) referred to chassis via the attenuator chain, and by adjusting the zero control, the voltage across the two 4.7K source resistors can be trimmed so that the meter reads zero with no input. Any voltage applied to TR1 upsets the balance, and the differential voltages on the sources cause the meter to deflect. The sensitivity of the meter is controlled by two series calibration resistors (RV1, RV2), one for a.c., the other for d.c. In practice, the input resistance attenuator chain always allows a direct input of 0.5 volt, and full scale deflection can be set by adjusting RV1 and RV2. The a.c./d.c. switch and calibration resistors are arranged so that an input via the a.c. probe reads the r.m.s. value.

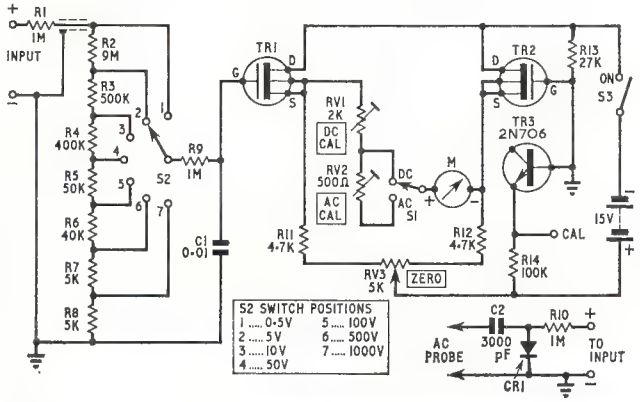


Fig. 1.—Circuit diagram of the FET Voltmeter. R1 is a ½ watt carbon resistor, R2-R8 are 1 per cent. high stability, and R9-R14 are ¼ watt carbon. C1 is a 50v. disc ceramic, and C2 is 1000v. working. CR1 is a 1000 p.i.v. silicon diode, or two lower voltage types in series. TR1 and TR2 are metal oxide silicon p-type FETs, and TR3 is a 2N706 used as a Zener diode.

The instrument is simply calibrated on d.c. by applying a known voltage to the input via the d.c. probe on any of the ranges and adjusting the d.c. cal. (RV1) until the meter reads the known voltage being applied. The author used a digital voltmeter to check the calibration voltages, but reasonable approximations can be obtained by using known Zener diodes or new dry batteries.

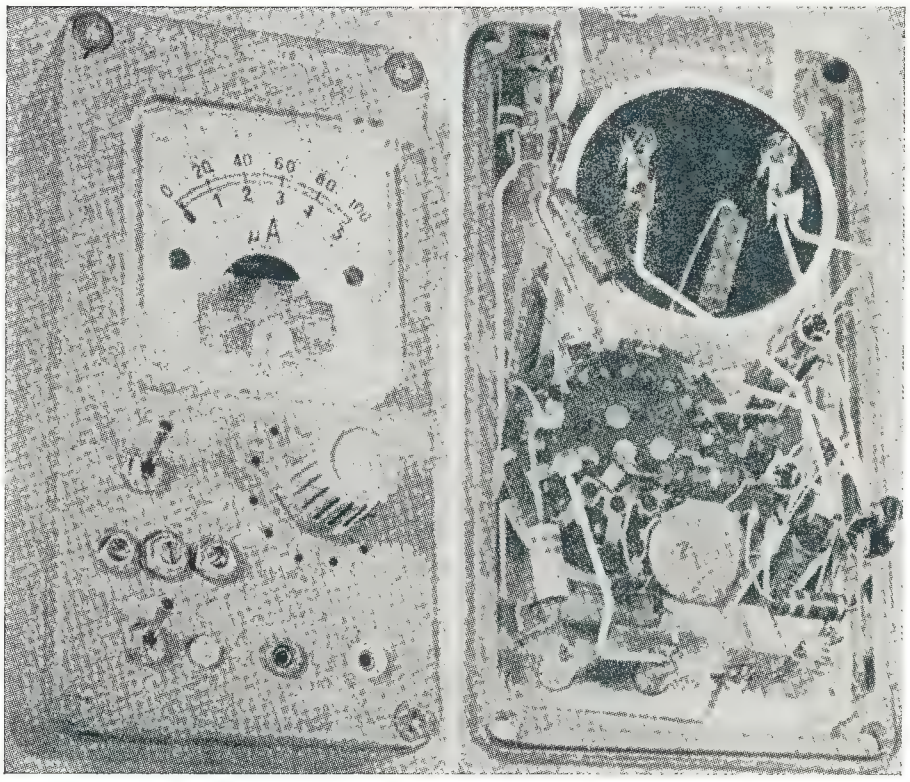
All ranges should be checked to ensure correct correlation. The use of 1 per cent. resistors (high stability carbon) will give an accuracy such that the meter itself will be the limiting factor. On the prototype no error could be detected on any range.

Using the a.c. probe, inject a known a.c. voltage (such as 6.3v. from a heater line) and adjust a.c. cal. (RV2) until the meter reads the voltage being injected. RV2 is in series with the d.c. cal. (RV1) and is small compared with RV1; this arrangement allows RV1 to be used as the main compensating calibration (to combat battery ageing) while not materially affecting t e a.c. alibration.

ROBES

The d.c. and a.c. probes are made from ball point pen cases (see Fig. 2). The d.c. probe consists of a 1 megohm carbon resistor installed as near to the point as possible, then 24 inch of small diameter screened lead is used to connect to the meter. The a.c. probe is constructed with a 3,000 pF. ceramic capacitor, a high p.i.v. diode, and a 1 megohm resistor. The ratings of the capacitor (C2) and diode (CR1) are important, for if it is intended to use the meter on the 1,000v. a.c. range, the capacitor working voltage and peak inverse voltage of the diode must be of a similar rating. Diodes can be used in series to estabilsh the rating, or use the meter restricted to the value obtainable.

The 3,000 pF. value for C2 can be exceeded of course, but anything much



G3LTZ's FET Voltmeter, illustrating the compactness which can be achieved by using miniature components and controls. On the panel, the Cal. 6.0v. terminal is a socket-type feed-through terminal. The rear view shows the two FETs centre-right, and the 2N706 top left.

* Reprinted from "Radio Communication," January 1968. This article originally appeared in "Wiltshire Hams," the Swindon and District Amateur Radio Club's magazine.

less than 3,000 pF. will give low output on 50 cycles.

FETs

The FETs used were of unknown origin but were p-channel metal-oxide silicon types and differed from the more usual types in that the bias applied to the gate was negative as was the drain potential (enhancement mode). There is no reason why other types cannot be used, such as the 2N3819, provided the correct polarity and biasing are used; this means either reversing the battery polarity (and also the Zener diode if you do) and/or transposing R13 and R14.

CONSTRUCTION

To be useful, it was decided that it had to be portable, and therefore the unit was built in the smallest Eddystone diecast box. The meter, of Japanese manufacture, just fitted nicely and left enough room for the rest of the components and the battery.

The a.c./d.c. switch and the on/off switch were of a miniature toggle variety, but miniature slide switches could also be used. The cal. controls and zero were miniature wire wound trimmer pots, but here again other types could be used.

The photographs give a clear idea of the layout, but it is in no sense critical and several versions have been built by club members using entirely different configurations, and meters from 2" to 6" have been used.

OTHER RANGES

The ranges chosen for the original were such that by using a small meter, most voltages could be read well on scale. The resistors with the ranges chosen work out to easily obtained values, but to design for different ranges the chain can still be kept to 10 megohms overall, with the tapping points altered.

For example, input chain of 10 megohms and 0.5 volt for f.s.d. means a total value of resistors from chassis end of input chain

$$= \frac{10 \text{ megohm}}{\text{Ratio of required range to 0.5v.}}$$

Taking the 500v. range, the ratio of 500v. to 0.5v. = 1000:1, therefore

Resistance of lower leg of chain = 10 megohms ÷ 1000 = 10K ohms.

Resistance of upper leg of chain = 10 megohms — 10K ohms = 9.99 megohms.

CONCLUSION

It has proved to be a most useful tool, simple to build, and for me, at any rate, it supercedes the valve voltmeter.

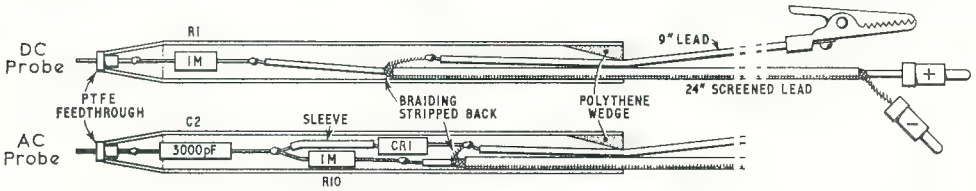


Fig. 2. Construction of the a.c. and d.c. probes.

isn't legally permitted anyway. The p.a. will glow very slightly at the 150 watts level if the key is held down for about 30 seconds or so.

The medium voltage h.t. need only be about 250 volts on load and does not have to be particularly well regulated. If you are going to run an adaptation of this transmitter with a simpler Geloso v.f.o., I would recommend a voltage regulator for the oscillator and that the medium h.t. have reasonable regulation or you will get more f.m. effect on your signal than is desirable.

Well that is about it fellows, maybe there is some food for thought in this article. The grid drive I forgot to mention should be between 2.5 and 3.5 mA. Good luck with the 6DQ5 in this circuit, other valves which could easily be used as well are the 6HF5, 6JS6-A, 8236 which have characteristics something similar. 6DQ6 valves might also be used providing voltage and current are reduced.

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DX NOTES

After many years of service to the magazine, Al VK4SS has had to retire from the job through ill health. The committee extends to Al its appreciation for his efforts and wish him a speedie recovery.

As from now the DX Editor is Peter Nesbit, VK3APN, to whom all notes and information should be sent. Peter's address is 32 The Grange, East Malvern, Vic., 3145.

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Publications Committee Reports

The committee met on Monday, 8th July, when correspondence was received from VKs 1VK, 2QL, 3QV, 3RN, 3AOT, 3ASI, 4CR, 4SS, 5QX and 9TB. Technical material was received from VK5RG and VK5ZDX who submitted a joint effort.

A review of technical articles in hand shows we are still in need of the shorter type of article, preferably with few or no drawings.

Financial figures for the July issue were not available, but up to June a deficit was reported. This deficit was due largely to the size of the May issue which incorporated the annual Federal reports and Balance Sheet. As the slight price increase granted at Easter is now in operation, we expect to gradually reduce this loss. The Victorian Division has agreed to support the magazine to the extent of advancing the money to pay for a further supply of wrappers.

The 1968-69 issue of the Call Book was discussed. It was decided to reduce the quality of paper used in this publication, and provided we get the same support from advertisers and buyers as we had last year, we will "cut square" without increasing the price. As at the 8th, we were holding orders for less than half the number of books as we had last year, and only a quarter of the advertising space has been sold. The proofs are almost ready for submission to the Department for checking, and the final listings will include additions and amendments up to and including tthe P.M.G. list for May 1968.

150W. AM-CW TX

(Continued from Page 7)

—100 to about 0 volt. The 12AU7 will cut off when its grid is about 30 volts negative in relation to its cathode. On c.w. the grid of triode 6-7-8 is slightly positive in relation to the cathode and draws grid current when the key is up. The grid is therefore negative in relation to earth, considering that the cathode is negative by virtue of its tapping on VR3. This voltage is say 30 volts negative, so the capacitor is negatively charged to about 30 volts.

When the transmitter is keyed the grid of the p.a. is immediately placed at about 100 volts negative due to grid current being drawn as soon as drive appears. The 0.01 uF. capacitor will charge in one time constant to —30 volts plus 66% of the remaining 70 volts of the —100 volts, which works out to —30 plus + —47 = —77 volts in one time constant, and by which time the 12AU7 is cut off, so to obtain a time constant of about 5 milliseconds the capacitor could be increased to about 0.047 uF. This is up to you and how you like your keying characteristics. It is also possible to grid block key the final if so desired.

No voltage above 360 volts has been switched in this transmitter for safety reasons, insulation and so forth. It is most advisable to put the p.a. final in a cage for safety reasons and also from the t.v.i. angle. Since it is "be kind to p.a. tubes week" it will be observed from the circuit diagram that the transmitter cannot be left switched on with carrier being radiated in either the c.w. or a.m. positions, a press to talk switch being used for a.m. and a key for c.w. The switch to bring the transmitter on for c.w. is disconnected for a.m. Relay contacts Rel. 1/2 are used to short the h.t. voltage on the modulator and driver sections to earth when changing over to receive, so preventing acoustic feedback on a.m.

A few voltage and currents that can be expected with this transmitter. The following 6DQ5 screen voltages are fairly typical: a.m. receive, —75 volts; a.m. transmit, no modulation, 5 volts positive; a.m. transmit, full modulation, 80 volts positive approximately. On c.w. receive: —55 volts, key up —9 to —10 volts, and key down +125 volts.

With normal full loading of the transmitter, the h.t. should be between 750 volts and 800 volts, and the h.t. current drain should be about 200 milliamps. at resonance, but if you really want to flog the p.a. valve you could probably load up as high as 250 mA., which is near enough to 200 watts input, which

W.I.A. D.X.C.C.
(S.W.L.)

Listed below are details relating to those Australian Short Wave Listeners to whom this Certificate has been awarded:—

Cert. No.	Call	Name	Date Awarded
1.	L3042	Eric Trebilcock	1/11/65
2.	L2022	Don Grantley	29/12/65
3.	L3211	Warwick Smith	31/5/66
4.	L4018	Chas. Thorpe	11/7/66
5.	L5080	Ernie Luff	25/1/67
6.	L3229	Bob Halligan	18/11/67
7.	L6021	Peter Drew	31/1/68

VK-ZL-OCEANIA DX CONTEST, 1968

N.Z.A.R.T. and W.I.A., the National Amateur Radio Associations in New Zealand and Australia, invite world-wide participation in this year's VK-ZL-Oceania DX Contest.

Objects: For the world to contact VK-ZL-Oceania stations and vice versa. **Note**: VK and ZL stations, irrespective of their location do **not** contact each other for contest purposes.

When? Phone: 24 hours from 1000 GMT, Saturday, 5th October, to 1000 GMT, Sunday, 6th October.

C.w.: 24 hours from 1000 GMT, Saturday, 12th October, to 1000 GMT, Sunday, 13th October.

RULES

1. There shall be three main sections to the contest:—
   (a) Transmitting phone.
   (b) Transmitting c.w.
   (c) Receiving—phone and c.w. combined.

2. The contest is open to all licensed Amateur transmitting stations in any part of the world. No prior entry need be made. Mobile marine or other non land based stations are not permitted to enter.

3. All Amateur frequency bands may be used but no crossband operation is permitted.

4. Phone will be used during the first week-end and c.w. during the second week-end. Stations entering both sections must submit separate logs.

5. Only one contact on c.w. and one contact on phone per band is permitted with any one station for scoring purposes.

6. Only one licensed Amateur is permitted to operate any one station under the owner's call sign. Should two or more operate any particular station, each will be considered a competitor and must submit a separate log under his own call sign. (This is not applicable to overseas competitors.)

7. Entrants must operate within the terms of their licences.

8. **Cyphers**: Before points can be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of five or six figures will be made up of the RS (telephony) or RST (c.w.) report plus three figures which may begin with any number between 001 and 100 for the first contact and which will increase in value by one for each successive contact. Example, if the number chosen for the first contact is 021, then the second must be 022 followed by 023, 024, etc. After reaching 999, start again from 001.

9. **Scoring**:

(a) **For Oceania Stations other than** VK-ZL. 2 points for each contact on a specific band with VK-ZL stations; 1 point for each contact on a specific band with the rest of the world.

(b) **For the rest of the world other than VK-ZL.** 2 points for each contact on a specific band with VK-ZL stations; 1 point for each contact on a specific band with Oceania stations other than VK-ZL.

(c) **For VK-ZL stations.** 5 points for each contact on a specific band and, in addition, for each new country worked on that band, **bonus** points on the following scale will be added:

1st contact	....	50 points
2nd „	....	40 „
3rd „	....	30 „
4th „	....	20 „
5th „	....	10 „

For this purpose the A.R.R.L. countries list will be used with the exception that each call area of W/K, JA, SM, UA will count as "countries" for scoring purposes as indicated above.

10. **Logs:**

(i) **Overseas Stations:**

(a) Logs to show in this order—date, time in GMT, call sign of station contacted, band, serial number sent, serial number received, points, **underline** each new VK-ZL call area contacted. Separate log for each band.

(b) **Summary Sheet** to show call sign, name and address (block letters), details of station, and, **for each band**, QSO points for that band, VK-ZL call areas worked on that band.

"All-band" score will be total QSO points multiplied by sum of VK-ZL call areas on all bands, while "single band" scores will be that band QSO points multiplied by VK-ZL call areas worked on that band.

(ii) **VK-ZL Stations:**

(a) Logs must show in this order—date, time in GMT, call sign of station worked, band, serial number sent, serial number received, contact points, bonus points. Use a **separate log for each band.**

(b) **Summary** to show—name and address in block letters, call sign, score for **each band** by adding contact and bonus points for that band, and "all band" score by adding the band scores together, details of station and power, declaration that all rules and regulations have been observed.

11. The right is reserved to disqualify any entrant, who, during the contest has not strictly observed regulations or who has consistently departed from the accepted code of operating ethics.

12. The ruling of N.Z.A.R.T. Executive Council will be final.

13. **Awards**. VK-ZL stations: The N.Z.A.R.T. will award certificates to the top scorer on each band and the top scorer in each VK-ZL district and silver mounted plaques to the top ZL scorers in both the phone and c.w. sections.

Overseas Stations: Certificates will be awarded to each country (call area in W/K, JA, SM, UA) on the following basis:—

(1) Top scorer using "all bands".
(2) Top scorer on individual bands.
(3) Other certificates may be awarded, to be determined by conditions and activity.

14. Entries from **VK-ZL stations** should be posted direct to:

N.Z.A.R.T. Contest Manager,
152 Lytton Rd., Gisborne, N.Z.,

to arrive not later than 31st Dec., 1968.

Entries from **Overseas stations** should be posted to above address or:

N.Z.A.R.T.,
Box 489, Wellington, New Zealand,

to arrive not later than 21st Jan., 1969.

RECEIVING SECTION

1. The rules are the same as for the transmitting section but it is open to all members of any S.w.l. Society in the world. No transmitting station is permitted to enter this section.

2. The contest times and logging of stations on each band per week-end are as for the transmitting section except that the same station may be lodged twice on any one band—**once on phone and once on c.w.**

3. To count for points, logs will take the same form as for transmitting, as follows: date, time in GMT, call of the station heard, call of the station he is working, RS(T) of the station heard, serial number **sent** by the station heard, band, points claimed. Scoring is on the same basis as for transmitting section and the summary should be similarly set out.

4. Overseas stations may log **only** VK-ZL stations, but VK receiving stations may log overseas stations and ZL stations, while ZL receiving stations may log overseas stations and VK stations.

5. Certificates will be awarded to the top scorer in each overseas scoring area and in each VK-ZL call area.

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OCEANIA WINNERS, 8th ALL ASIAN DX CONTEST 1967

(J.A.R.L.)

HAWAII:			
KH6IJ	Multi.	5894	points
KH6EBQ	„	2718	„
AUSTRALIA:			
VK3AXK	Multi.	4725	points
VK8UG	„	2704	„
VK3ABR	„	80	„
VK4SS	28 Mc.	66	„
VK3RJ	„	46	„
VK3ABA	21 Mc.	32	„
VK2APK	14 Mc.	2112	„
T.N.G.:			
VK9GN	Multi.	3836	points

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9th ALL ASIAN DX CONTEST 1968

PRECIS OF RULES

Time: 1000z, 24th August to 1600z, 25th August.

Bands: 1.8 through 29.7 Mc. on c.w. only.

Call: Non Asians "CQ AA"; Asians will call "CQ TEST".

Aim: The world to work Asian countries.

Entry: (a) Single-band single-operator. (b) multi-band, single-operator.

Serial Numbers: Send RST plus two figures denoting age for OM; RST plus 00 (zero zero) for YL.

Scoring: One point per Asian contact and a multiplier of one for each Asian country on each band. Total score is total contact points by total countries worked for single-band op. and total contact points by sum of total countries all bands for multi-band op.

Log deadline: J.A.R.L. Contest Committee, P.O. Box 377, Tokyo Central, Japan, by 30th November, 1968.

NEW CALL SIGNS

APRIL, 1968

VK1PM—R. E. W. May, 76 Monaro Cres., Red Hill, 2603.
VK2JP—S. B. Mason, Box 187, Walker St., Cowra, 2794.
VK2NW/T—D. W. Bridge, C/o. New Tribes Mission, Plumpton, 2761.
VK2BAQ—A. G. Svensen (Sqd. Ldr.), C/o. Officers' Mess, R.A.A.F. Base, Richmond, 2755.
VK2BBQ—G. C. Page, 20 Marshall Ave., Warrawee.
VK2BED—A. H. Bennett, 8 Blaxland St., Matraville, 2036.
VK2BFJ—F. S. A. Jenkins, 14A Thorn St., Pennant Hills, 2120.
VK2BLN—L. L. Neaverson, 23 Vernon St., Strathfield, 2135.
VK2BRC—Taree O.K. Youth Radio Club, 34 Albert St., Taree, 2430.
VK2ZTF—W. R. Clark, 58 Mooramie Ave., Kensington, 2033.
VK3AST—S. J. Lloyd (Surg. Cmdr.), 100 Winbourne Ave., Mt. Eliza, 3930.
VK3ZAZ—S. R. Gregory, 1006 Malvern Rd., Armadale, 3143.
VK3ZVE—P. A. Sweetser, Flat 2, 395 Dandenong Rd., Armadale, 3143.
VK3ZYQ—R. C. Morgan, Gapsted, via Wangaratta, 3677.
VK4IX—J. E. W. Dahl, 51 Lansdowne St., Wilston Heights, 4051.
VK4KH—K. F. Hoffmann, 10 Druce St., Toowoomba, 4350.
VK4PN—P. Lyons (Rev.), Station: Catholic Presbytery, Alpha, 4724; Postal: P.O. Box 16, Alpha, 4724.
VK4VF—A. H. Willmore, 6 Alfred St., Maryborough, 4650.
VK4XV—F. R. Campbell, 5 Coolah St., Aspley, 4034.
VK4ZOL—M. G. Foster, M.Q. 26, Borneo Barracks, Cabarlah, 4350.
VK4ZRJ—R. C. Harris, 127 Haig Rd., Torwood, 4066.
VK5ZDZ/T—J. F. Ingham, 122 Esmond Rd., Port Pirie, 5540.
VK5ZEK—M. R. Kuss, Lot 30, Wren St., O'Halloran Hill, 5158.
VK5ZGE—R. D. Averay, 1 Belgrave Tce., Plympton, 5038.
VK5ZOO/T—D. E. Stacpoole, 6 Gardiner St., Mt. Gambier, 5290.
VK6CU—R. D. Coleman, Onslow, 6710.
VK6FN—M. L. Faulkner, Giblett St., Bridgetown, 6255.
VK7CM—C. H. Miller, 13 Grange Ave., Taroona, 7006.

CANCELLATIONS

VK1AS—A. G. Svensen. Now VK2BAQ.
VK1FB—J. B. White. Transferred to Vic.
VK2PV—J. P. Vesper. Deceased.
VK2RA—R. A. Priddle. Not Renewed.
VK2SX—F. S. A. Jenkins. Now VK2BFJ.
VK2AJE—B. L. Mills. Not Renewed.
VK2AWF—B. J. Foster. Not Renewed.
VK2BDR—A. M. Brighton. Not Renewed.
VK2BTR—T. Roberts. Transferred to S.A.
VK2ZAW—D. G. Allen (Bro.). Not Renewed.
VK2ZGX/T—D. W. Bridge. Now VK2NW/T.
VK2ZJJ—J. A. M. Brady. Not Renewed.
VK3AMQ—G. C. Page. Now VK2BBQ.
VK3ZWG—S. R. Gregory. Now VK3ZAZ.
VK4YY—G. R. Crosier. Ceased Operation.
VK4ZDJ—J. E. W. Dahl. Now VK4IX.
VK4ZKH—K. F. Hoffmann. Now VK4KH.
VK4ZRC—F. R. Campbell. Now VK4XV.
VK4ZRK—R. J. Wyeth. Not Renewed.
VK6BA—W. S. Moore. Deceased.
VK6TN—T. S. Long (Portable). Ceased Operation.
VK6ZFM—M. L. Faulkner. Now VK6FN.

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Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

ROSS HULL CONTEST

Editor "A.R.," Dear Sir,

With reference to the letter by W. J. Howse, VK6ZAA, in the July issue (p. 15), Mr. Howse should get his facts straight.

The Ross Hull Contest rules stated three sections: (a) Transmitting Open, (b) Transmitting Phone, and (c) Receiving Open.

There is no mention of a "Transmitting Closed" section. This seems to be a figment of Mr. Howse's (dare I suggest "prejudiced") imagination. Section (a) is precisely what it says—an "open" section where the use of more than one basic form of transmission is mandatory. Section (b) is also what it says—for entrants using only phone methods of communication. A3, A3(a) and F3 can only be considered as falling in this phone group.

As Mr. Howse comments "Why c.w. . . . Why not select r.t.t.y.?" Why not indeed Mr. Howse. Make one or more contacts on r.t.t.y. and submit your log in the "open" section. But on the other hand if you choose to not use c.w. or r.t.t.y. or some other form of non-phone communication then you do indeed handicap yourself—by being ineligible for the open. It is your choice though.

—D. H. Rankin, VK3QV.

"S.W.R. INDICATORS—FACT OR FICTION"

Editor "A.R.," Dear Sir,

After reading the article of Mr. J. G. Reed, VK2JR, entitled "S.W.R. Indicators—Fact or Fiction," one could be excused for throwing that s.w.r. bridge into the "junk box". There are, however, a few factors which have escaped consideration. These may be readily verified by experiment if mathematical argument does not convince.

(1) A non-reactive load presented to the transmitter allows loading by variation of coupling to be adjusted without significant detuning of the final.

(2) A non-reactive load equal to the transmission line characteristic impedance presented to the line by the antenna results in the impedance at the transmitter end of the line being independent of line length, and for constant antenna resistance, of frequency. If the s.w.r. at the antenna is not zero, changes of frequency can cause considerable detuning of the final, particularly if the line length is long relative to the operating wavelength, as at v.h.f.

(3) For a given transmitted power, maximum line voltages and currents are up to double those for a flat line. Since power equals V^2/R, power dissipated in the line conductance is increased. A similar argument based on current applies for series line resistance. Again, this factor is most significant at v.h.f. when line losses may be a major consideration.

Let us begin at VK2JR's conclusion that unity s.w.r. as measured by the s.w.r. indicator will indicate a resistive load looking into the antenna coupler equal to the design impedance of the bridge. When this case is considered in view of the above factors, it can be seen that the only advantage to be gained by unity s.w.r. is that discussed in (1). Effects due to standing waves on the transmission line beyond the coupler still exist. It is concluded, therefore, that this method of feeding is not desirable.

What is required at the coupler is a resistive impedance presented by the line, independent of frequency and line length. This can be achieved only by matching at the **antenna** end of the line, using perhaps an s.w.r. indicator if you dare, and some form of antenna tuning such as gamma match or stubs. For normal line impedances the coupler at the transmitter end of the line is unnecessary, and the line can be connected directly to the output coupling circuit of the transmitter. I have assumed that a non-radiating feeder is required.

One final thought is that the s.w.r. indicator makes a jolly fine tune-up indicator for improperly neutralised finals.

—Robert Halligan, VK3AOT.

N.F.D. CONTEST

Editor "A.R.," Dear Sir,

I was disappointed not to see, together with the results of the 1968 John Moyle Memorial N.F.D., the usual comments provided by competitors, as I always find it very interesting to read what others thought about it.

I would imagine that many commented on the fact that the A.R.R.L. Contest was run during the same week-end. For myself, I think this was a mistake, as I found many stations, VKs included, more interested in A.R.R.L. contacts than contacts with a Field Day station. QRM was a slight problem and perhaps precluded some contacts with overseas stations for the less elaborate or lower powered N.F.D. station.

However, one aspect of the week-end rather concerned me. This was the matter of stations operating in the Field Day Contest handing out numbers to A.R.R.L. Contest stations and accepting such numbers exchanged. This was particularly so naturally with contacts with the U.S.A. I did myself contact some U.S.A. and VE stations, but in each case exchanged two sets of numbers, one for the N.F.D. Contest and one for the A.R.R.L. Contest. I feel that this was the correct procedure, and that dual participation should not be allowed without two sets of numbers being exchanged. After all, you don't normally run a horse in two races simultaneously, and if operating in two contests should do so fully.

This is probably a matter for the Contest Committee to rule on, however it may be interesting to hear the subject discussed generally before that committee makes a decision.

So, what do others have to say on the subject?

Once again I really enjoyed every minute of the Contest and hope to be in the next one too.

—Ian J. Hunt, VK5QX/P.

P.S.—Appended is a table of the top two scores for portable phone and portable multi-op. for the years 1965 to 1968 inclusive. Is the big jump in scores, co-incidence, better conditions, or A.R.R.L. Contest contacts?

Year	Portable Phone	Portable Multi-op.
1965	925	1648
	583	1438
1966	413	3969
	301	2649
1967	752	3786
	518	2621
1968	523	6400
	493	2140

PROPOSED IDENTIKIT CODE

Editor "A.R.," Dear Sir,

I suppose most Amateurs who join in repeated rag chews tend to form a mental picture of what the other chap looks like.

When one eventually meets this friend of the air at a convention or other meeting place he may find that the other Amateur is more or less the opposite of what he had mentally (perhaps subconsciously) pictured.

I would suggest that an identikit type of code be developed for possible use to describe one's general appearance to fellow Amateurs, say a code of five or six letters.

The first letter could represent a height group, e.g. say A represents 4 ft. 9 in. to 5 ft. 0 in.; B between 5 ft. 0 in. and 5 ft. 3 in., etc. (Could of course have closer limits if desired.)

The second letter of the code word could represent general build, such as A for slim, B medium build, C stout, etc.

The third letter could refer to complexion.

The fourth say whether clean shaven, moustache, beard, moustache plus beard, etc.

The fifth letter of code say colour of hair or lack of same.

The sixth say type of nose.

This of course is only rough idea for further discussion if considered worthwhile.

—Cyril VK4CR.

[Mr. Renton has answered his own question. Reverse the phase 180 degrees and you have the answer.—Ed.]

GB3NEW AT THE NATIONAL EISTEDDFOD OF WALES

College of Further Education,
Colcot Rd., Barry, Wales, U.K.

Editor "A.R.," Dear Sir,

From 5th to 10th August, 1968, inclusive, the Barry College of Further Education Radio Society will operate an Amateur Radio station (call sign GB3NEW) at the National Eisteddfod of Wales at Barry. The National Eisteddfod is a Festival of Arts held annually at a different location in Wales, and this is the first time that an Amateur Radio station will operate from the Eisteddfod. To commemorate this event we will be issuing a special QSL Certificate to each station which contacts us during the week.

We will be operating on 3.5, 7, 14, 21, and 28 Mc. between 0800 hours and 2000 hours GMT each day on s.s.b. and c.w. Our equipment will include a Hallicrafter SR400 Transceiver, a KW2000A Transceiver and an Eddystone EA12 Receiver. The main antenna will be a Mosley TR33 Jr. beam at a height of 60 ft.

Will you please publicise this event in your official journal? We will be pleased to arrange skeds if requested to do so. We are of course particularly anxious to contact Amateurs who have ties with Wales, the Eisteddfod, and Barry.

Finally, this event will never be repeated by our Society and possibly will never be established at the Eisteddfod again.

73 and good DX.

D. H. Adams, GW3VBP,
Secretary.

— • • • —

VHF NOTES

From the few reports received it is very apparent that the winter is taking its toll of v.h.f. operators. Activities in VK3 seem to be limited to fox hunts, scrambles and group meetings. No reports have been received from Interstate correspondents.

Hoping for an improvement in activity and in the quantity of copy, and last, but not least, more space in "Amateur Radio." 73, Cyril VK3ZCK.

THE REMEMBRANCE DAY FORMULA

DR. D. R. BLACKMAN, VK3TX*

The Remembrance Day Contest, as we all know, is an annual event in the Amateur's calendar conceived with the object of reminding all of the price some had to pay that we today might enjoy, amongst other things, this hobby of ours. It has been used in the past, and by a few still is, to talk to wartime comrades, but it would appear that the primary purpose of the contest was not thought of in these terms. Whilst there is an apparent contradiction in associating a contest with such a solemn topic as Remembrance Day, we are aware of the particular enthusiasm which a radio contest engenders amongst Amateurs; a contest is perhaps the only distinctive memorial Amateurs as a body can raise.

It is, however, a contest; like all other contests it is subject to certain rules with regard to how the winner is to be determined, and therein lies the basis of the present controversy. The status of the R.D. as a memorial, and the opportunity it offers for Amateurs to meet people in a friendly QSO, as they always have done, are not in question. Quite the reverse, in fact. Strong in the minds of most people searching for new formulae is the hope, not just of improving the **contest**, but attracting more operators on to the air on this day. A formula which is patently unjust will not do this.

I classify competitions roughly into two sorts. There are "cut-throat" types, such as foot races, and point score types such as cricket. A little reflection will show that the rules surrounding the latter type must be much more rigid than the cut-throat variety. It does not matter in a foot race how long it takes the runner to reach the post or how many enter—the first man over the line wins. On the other hand, one cannot bat 12 men in an innings (or play extra men at football, etc.) for the obvious reason that the opportunity for scoring more runs (goals, points, etc.) becomes available. And yet in the R.D. we have had a competition between States in which the number of entrants is the variable and arbitrary number who care to join in, and only a fraction of these care to submit logs. From the point of view of the R.D. this arbitrary entry is, of course, an excellent thing, but from the point of view of running a **contest** it is making life very difficult indeed.

Considering just the contest part of the business, then, what is wanted is a formula which gives an **unbiassed** result allowing for (at least) the following facts:

(a) The number of participants between States varies widely.

(b) The proportion of licensees entering also varies widely between States. As a matter of observation from past years, this proportion is much lower in VK2 and VK3 than in the other Divisions typically by a factor of up to 5.

(c) The formula is to encourage maximum participation.

(d) The formula is to give weighting to the contribution from all entrants.

(e) It is to establish a winning Division for the purpose of awarding the trophy.

I am not the first person with mathematical training to have looked at this problem; over the years the Federal Council has had the advice of several people, mostly more competent than I am. I take comfort from the fact that I arrived independently at the same conclusion as they did—there is NO formula which will satisfy these conditions and remain workable in the sense that it is incapable of manipulation. Having all this in mind, the 1968 Federal Convention passed the following resolution:

> "That it is considered that it is impossible to arrive at an equitable and workable formula to determine the winning State in the R.D. Contest under the present terms of reference, therefore it is recommended that all Divisions consider the entire concept of the Contest and submit to the 1969 Convention their suggestions for re-casting the R.D. Contest and as an interim measure, it is resolved that the rules for 1968 be as suggested by the VK6 Division, i.e. that the rules be similar to 1966 except that v.h.f. participants be on the same basis as for the 1967 rules."

In order to proceed, we must waive one or more of the conditions of (a) to (e). The logical way of implementing the resolution of Federal Council is to agree on what conditions are to be maintained, and which are to be relaxed. The following are some examples of possible bases for the contest, with comments on what I see as their deficiencies. These are given purely for the sake of illustration. It should be added that a number of other aspects such as the scoring table and the retention of the three mode sections (c.w., phone, open) are separate considerations again.

SOME POSSIBLE CONTESTS

(1) **Outright Contest**: The winner is an individual who scores the highest number of points.

This is the traditional contest arrangement, and assessment is easy. In the minds of some, it violates condition (c), and in particular, it would make it hard for "Z" calls to win. It also revokes vigorously the past history of the R.D. as a Divisional contest.

(2) **Best N Logs**: The State whose aggregate of the top N logs is highest wins. N can be selected in a number of ways. It should be noted that the principle invoked in selecting the best N is that of equalising the basis of comparison between Divisions, whatever the value of N. This method is, therefore, by definition in conflict with (d), but avoids altogether the difficulties of (a) and (b). Some values of N are:

(i) N = 1. Best individual score alone determines winning Division. Clean and easy administration.

(ii) N = somewhere between 10 and 30. On past records, this would include most of the significant logs submitted, and omit only low scoring ones. Violation of (d) is not so severe, and Divisions might hand out a certificate to those whose logs qualified for inclusion, a process analogous perhaps to elimination heats.

(iii) N = smallest number of logs submitted by any one Division for that year. Thus, if VK7 submitted the smallest number of logs, 50, all VK7 scores would count but only the best 50 of all other States' scores. This scheme, I fear, is susceptible to manipulation by failure to submit logs, and might tend towards (i) in the extreme. At least under (ii), if a Division cannot raise the specified number of logs it is losing itself points.

(3) **Averaging Methods**: Mathematically, the obvious solution to this problem is to compute an average points/contact figure. Given an equitable scoring table, then the most efficient group of operators will win. Removal of a lot of other superfluous stuff, this is the basis of the 1967 formula. (The 1967 formula had other inclusions not relevant here.) However, it is true that a State average of 180 can only arise because some people get more than 180 and some less. If none realised before, there is no doubt everyone realises now that one does one's State a service by **not** submitting a log if it is going to be less than about 170. In a short space of time, I suggest, the continued application of the 1967 formula would lead to progressively higher averages (as a greater number of low scoring logs were voluntarily omitted), and perhaps ultimately a (i) type situation in the extreme.

(4) **Participation Formulae**: Some people feel strongly that the number of participants should somehow contribute towards the assessment of a winner. This is a legitimate and indeed interesting view, emphasising conditions (c) and (d) very strongly. However, the only contest I can see available along these lines is to award the trophy to the Division submitting the greatest number of logs. A scoring table, etc., would have to be used to evaluate other performance which would be separate altogether from the trophy.

If encouragement to participate and submit a log (perhaps with a small minimum score like 10 to keep the

(Continued on Page 16)

* 129 Clayton Road, Clayton, Vic., 3168.

THE R.D. FORMULA

(Continued from Page 15)

thing rational) is what is wanted, then this contest would certainly be doing that. However, it is potentially biased in favour of the larger States, in spite of the fact that VK2 and VK3 would not have won uncommonly often in the past.

(5) **Composite Formulae**: This leads to the concept of formulae which allow not only points scored and number of entrants, but a variable which has not been mentioned thus far, the available number of licensees in the Division.

The formulae in the past have been of this latter type, and the impossibility of achieving an unbiassed rule is explicit in the Federal motion. The basic deficiency, I suspect, is that these three variables (number of points, number of entrants, number of licensees) all have independent relationships between themselves which are in no way connected with the problem of a contest.

The most obvious example of such a connection is between number of State entrants and number of State licensees. It is irrelevant whether one believes the particular mathematical formula relating these two, which was given in "A.R.," December 1965, but related they certainly are.

Without some knowledge of what the relationship is, to use a formula involving State licensees and entrants is to build a bias into the formula the nature of which one has not attempted to predict.

The procedure in the past, it would appear, has been to go ahead anyway and then decide afterwards from the results that the formula is biassed. Not a very rational procedure. But then is one not trying to compare incomparables? One does not put a feather weight and a heavy weight boxer together and subsequently try to establish from the wreckage whether, considering the disadvantages, the feather weight really won.

If we are going to use the word "contest" with the R.D., let's make it a contest and not an annual exercise with an end result which, even if unknown to its instigators, is largely predetermined by the mathematical formulation.

YOUR THOUGHTS?

Some time in the next few months Divisional Councils are going to have to consider this whole matter of the R.D., since it is due to be discussed at the 1969 Federal Convention. As you reflect on your participation in the R.D. for 1968, reflect also on how you view the contest, and convey your thoughts to your Council. The present difficulties in formulating contest rules has, I am sure, not decreased the pleasure of operating in the R.D.; let us see if it can be made a good contest also.

— . . . —

FEDERAL QSL BUREAU

Am grateful for all who supplied information on disposal instructions for QSLs for VK9RJ, R. J. Wirth, O.T.C. Radio Station, Nauru. It transpires his QSL manager is K6UJW, but owing to the cost factor, all QSLs on hand have been mailed to VK9RJ at Nauru. He can take it from there.

All VK3 Amateurs were dismayed to learn of the sudden indisposition of Eric Trebilcock, BERS195, the Inward QSL Manager for VK3. We are happy to report that Eric has made a reasonable recovery and with care and not too much football excitement, should soon be back to his old form.

The Russians have declined to forward VK QSLs direct to the Divisional Bureaux. It is a pity they have to be odd man out. Further representations are being made which it is hoped will impress them with the necessity for co-operation.

Tubby Vale, VK5NO, ex VK8NO, reports in from the old QTH in Gawler. Tubby states that since leaving the N.T. and with a little moderate living, the B.P. has returned to reasonable levels. Tubby has found himself a quiet workaday niche.

Sue Ward has done a good job on VK8UG QSLs since the departure south of Tubby Vale. However, Sue is also due to depart from Gove in August.

Willis Island will be activated again from June to December 1968 by the call sign VK4EV. It is understood that the operator is Gavin Brain, VK3AEJ, and the QSL instructions stipulate via the VK3 Bureau ONLY.

The D.A.R.C. is strongly publicising the 14th European DX Contest 1968 which will be held as follows: C.w., zero GMT August 10 to 24z August 11; Phone, zero GMT Sept. 14 to 24z Sept. 15. A maximum period of 36 hours operation is allowable in either contest. Full information from this Bureau.

The S.R.J., Yugoslavia, have simplified their award requirements by waiving the necessity to forward QSLs. Henceforth a certified list (two Amateurs or Awards Manager) will suffice. The stated number of I.R.C. is still required.

The L.M.R.E. (Mexico), to celebrate the staging of the 1968 Olympics in their country, have announced an international contest running from March 21 to December 31, 1968. The object is to contact as many Mexican stations as possible in the period. All bands, all modes but no crossband or crossmode. Efforts are being made to activate all Mexican districts and special prefixes—4A1, etc.—may be issued. The main awards are a gold medal, silver medal, and a diploma to the leading stations in each continent. Full details from this Bureau.

A special station was operating on the contest site during the staging of the 13th World Ploughing Contest held in Rhodesia on 26th and 27th April. Unfortunately information on the operation was not received until after the event was concluded. However, other stations in the area continued the operation for eight days after the conclusion of the contest. Any station who contacted ZE1WPC during the abovementioned 10 days will receive a special multi-coloured QSL as a memento.

Al Scarlett, K1CC, ex W2CC, well known to VK stations for 40 years, has resumed his schedules with Australian stations after an eight-month lay off. The lay off was occasioned by Al's retirement, sale of his Scarsdale property, purchase of a mobile home in Florida and another home in Wilton, Conn. A change in call sign and the erection of an antenna at Wilton also caused delays. Al is again running schedules with VKs 3XB, 3HL, 5BO and yours truly.

—Ray Jones, VK3RJ, Manager.

— . . . —

N.S.W. INTRUDER WATCH CO-ORDINATOR

VK2 intruder watch volunteers should contact Ross Treloar, VK2BPZ, 23/8 Fullerton Street, Woollahara, N.S.W.

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SIDEBAND ELECTRONICS ENGINEERING

It is good to be back home again after a long absence overseas. I have taken over from Alex Outtrim, who, during my absence, did an excellent job for you all and for me. I missed last month's deadline for an advertisement about a stock clearance sale, all brand new equipment, now going on since closing off at the end of the last financial year. The sale is still on for most items, so there will still be some real bargains to be had.

While returning on the "Marconi," sailing between Dakar and Cape Town, I heard several good VK 20 metre transmissions from stations in contact with Canadians and Americans. That is the area of West Africa where we all have doubts about getting into, but it is just a lack of activity there at the right time, around 0600 GMT.

While overseas I laid contacts with suppliers of Amateur gear in the U.K., Germany and Japan. More about the results of that businesswise in future advertisements in "A.R." or write me about a "news-sheet" that will give up to date information without the usual delays in publication.

During my absence something happened here with **HY-GAIN** Antennas, sufficient to state that I am still their Amateur Antennas distributor for Australia, appointed by them and by their export office back in 1965.

In Germany I had the privilege to see the manufacture of crystal filters, starting from 6" long raw, but artificially grown, quartz crystals. They can now safely claim shape factors better than those of mechanical filters and off-frequency suppressions of more than 100 db. Their filters, with now eight crystals in them, are only ¾" x 1" x 1½" in size.

Japanese Amateur products are improving, they are catching up with the Americans also in our field. I have seen and heard and tested Yaesu-Musen, Star and Trio sets and shall soon market the brand of my choice, the best of the lot as I see it.

Equipment made in the U.K. is still of the old solid style with good performance. In the U.S.A. a slightly larger 30w. plate dissipation TV line output valve is now being used in transceivers, allowing a bit more peak input and output, but . . . unless changes are made in power supplies and their design to handle these peak demands without a serious drop in supply voltages, the linearity will suffer. I continue to recommend local products that are made for 50 cycles and 240v., have separate 300 and 800 volt sections instead of getting both from one transformer secondary with bad regulation as a result.

Speaking about linearity; read my June 1968 advertisement again. Grounded grid amplifiers, "after-burners," without tuned input circuits, may be amplifiers all right but they are not quite as **linear** as those with tuned input circuits. Personally I will not sell them and in this respect I may repeat my "credo," my function here in the Amateur world. To supply the best gear at the lowest possible cost and not to market equipment that does not come up to my standards.

As to fully transistorised gear that I have seen during my trip, there is neat and interesting stuff being made, but not for the power levels that most Amateurs demand or take for granted. Even for 100w. PEP we still need valves in the output stages, the high power transistors are still too dear and delicate. Unless weight, space and power consumption savings are really important, I shall still stick to valves, particularly when a power socket is available within 30 feet distance.

Here is what I have to offer in my Clearance Sale as long as the stock will last:

SWAN SW250 6 metre SSB Transceiver .. $400
SWAN SW350C All-Band Transceiver $525
SWAN SW500 All-Band Transceiver $600
SWAN SW500C All-Band Transceiver $675
Galaxy V. Mk. 2 All-Band Transceiver $500
Gonset SB-2 2 metre Transceiver $350
Hy-Gain TH6DXX with BN-86 Balun $200
Newtronics 4BTV 10-80M Vertical $65
HEATH HW32A Transceiver Kit $165
HEATH HW32A Transceiver, assembled $185
HY-GAIN TH3JR $100

HEATH HA-14 **Linear** Amplifier Kit $150
AC Power Supply Kit for same, local design $60
WEBSTER Bandspanner Mobile Whip with ball mounting plus spring $55
Crystal Filters, 5165 Kc., own production .. $10
KVG XF-9B 9 Mc. Filters, with Carrier Xtals $35
Co-ax Baluns for G5RV Antennas $10
Galaxy V. Mk. 2 Transceiver, demonstration set, under new warranty $450
Used Galaxy III. Transceiver $275

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★ A.R.R.L. — **THE RADIO AMATEUR'S HANDBOOK** — 45th Ed., 1968 Edition .... **Price $6.10 Posted**
The standard reference work and text for everyone—Hams, Experimenters, Students, Engineers, Laboratory Men, Technicians.

★ ORR — **THE RADIO HANDBOOK** — 17th Edition .... **Price $13.45 Posted**
Tells how to design, build and operate the latest types of Amateur Transmitters, Receivers, Transceivers and Amplifiers.

★ STONER & EARNSHAW — **THE RADIO TRANSISTOR HANDBOOK** .. .. **Price $6.65 Posted**
This up-to-date Handbook covers a wide range of communication for both Amateur Radio and Commercial Applications.

★ A.R.R.L. — **THE RADIO AMATEUR'S V.H.F. MANUAL** .. .. **Price $3.00 Posted**

★ A.R.R.L. — **UNDERSTANDING AMATEUR RADIO** .... **Price $3.00 Posted**

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★ A.R.R.L. — **SINGLE SIDEBAND FOR THE RADIO AMATEUR** .. .. **Price $3.73 Posted**

★ A.R.R.L. — **THE MOBILE MANUAL FOR RADIO AMATEURS** .. .. **Price $3.73 Posted**

★ A.R.R.L. — **THE RADIO AMATEUR'S LICENSE MANUAL** .... **Price 85c Posted**

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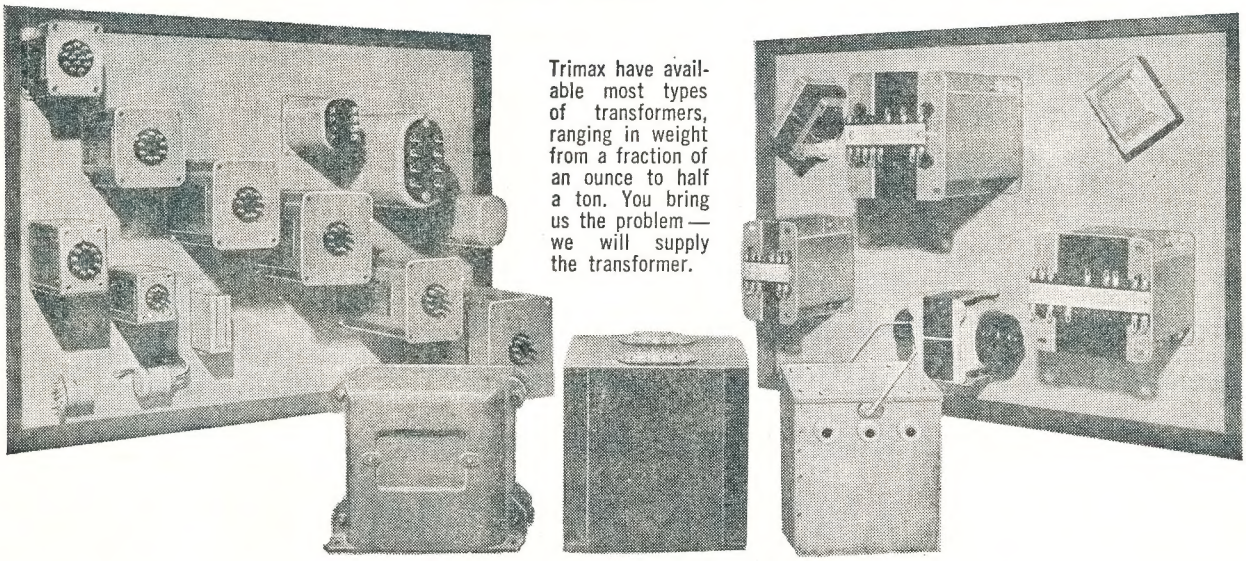

Trimax have available most types of transformers, ranging in weight from a fraction of an ounce to half a ton. You bring us the problem — we will supply the transformer.

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LM 51

Yaesu SSB EQUIPMENT

Designed and manufactured in Japan, this equipment ranks with the best.
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FRDX-400 Receiver, successor to the famous FR-100B, has the additional features of 160 m. band, I.F. "T" notch filter, 100/25 kc. calibrator, selectable slow/fast A.G.C., new styling of cabinet and panel. Provision for internal installation of F.E.T. V.H.F. converters, F.M. with squelch, fixed channels, C.W. and F.M. mechanical filters, WWV, transceiving with FLDX-400, etc.

FLDX-400 Transmitter, matching design, electrically similar to the FL-200B. Mechanical filter, VOX, ALC, conservative 300 watts peak. Adaptable to FSK for RTTY.

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FTDX-100 New model of the well known, low current drain, transistorised transceiver AC/DC power supply built-in. Many additional features. Ideal for portable/mobile. 150w. peak input.

Also available: Transceiver FT-50, Transmitter FL-50, Receiver FR-50, Low Pass Filter FF-30DX, Type "F" SSB Generator assembly, SWR Meter K-109, Yaesu Valves and Spares, Co-ax. Connectors, Hy-Gain (U.S.A.) Beams.

Our Policy: 90-day manufacturer-backed warranty. All sets tested before despatch. After sales service & spares availability.

Obtainable from the Australian Agents: **BAIL ELECTRONIC SERVICES**
60 Shannon St., Box Hill North, Vic., 3129. Phone 89-2213

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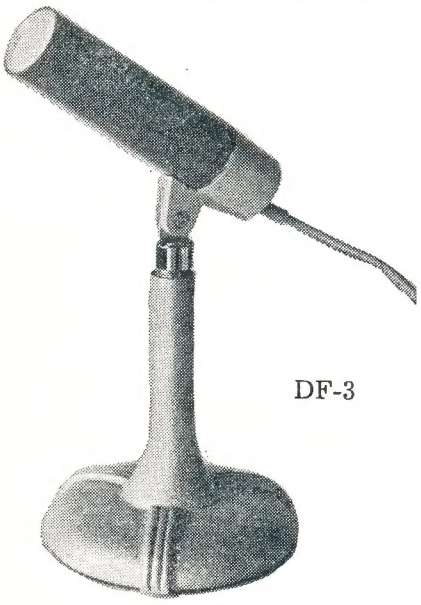
FOSTER DYNAMIC MICROPHONES

SPECIFICATIONS:

Output Impedance .... 50 ohms or 50K ohms
Effective output level .... —55 db. [0 db. = (one) 1V. Microbar]
Freuency response .... 50 to 15,000 c.p.s.

OMNI-DIRECTIONAL DYNAMIC:

Plastic Diaphragm.
Size: 4½" long, 1¼" diameter.
Cable: 12 ft. of P.V.C.
Swivel fits ⅝" 26 t.p.i. Stands.
Colour: TWO-TONE GREY.



DF-3

Retail Price 50K ohms: $9.60 + Sales Tax $1
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Nominal Frequency Range: 550 Kc. to 30 Mc. Internal 500 Kc. crystal. VFO frequency coverage: 250-500 Kc. 2 Kc. dial divisions.

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● **MILLER 8903B PRE-WIRED I.F. STRIPS**

455 Kc. centre frequency, 55 db. gain. Employs two PNP transistors and diode detector.

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Full CW-AM-SSB coverage, 80-40-20 metres. 180w. PEP SSB-CW. VOX-PTT-ALC. 10 Kc. Receiver offset tuning.

Kit **$328.78**, Wired **$428.78**.

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A fibre-glass printed circuit board, the finest German crystal filter, diode ring modulator, and solid state circuitry all contribute to make the A111 the finest SSB Exciter available. Specifications: Sideband suppression, 80 db.; carrier sup., 65 db.; audio freq. response, 350 to 3,000 cycles; mic. input, 1 mV. on 5K ohm load. Incorporates VOX amplifier and relay amplifier.

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Frequency coverage: 4950 to 5550 Kc. Frequency stability better than 100 c/s. over 12 hours long term; better than 8 c/s. over 10 minutes if enclosed in suitable box. Output: 350 mV. on 220 ohm load.

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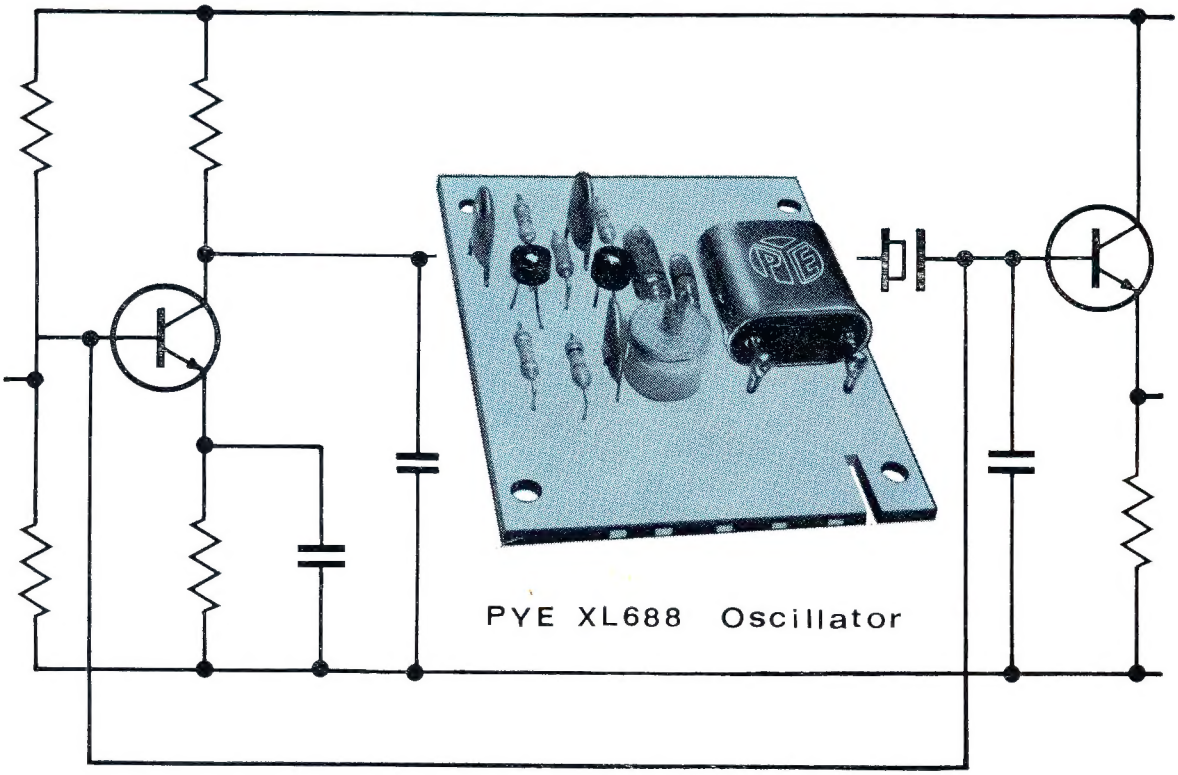

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